Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Code :** | **14PH2007** | **Max. Marks :** | **100** |
| **Sub. Name :** | **HEAT AND THERMODYNAMICS** | **Duration :** | **3 hrs** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1 |  | Derive the general expression and six different relations for Maxwell thermodynamically relations. | CO1 | 20 |
| (OR) | | | | |
| 2 | a | State the four different Laws of thermodynamics. | CO1 | 8 |
|  | b. | A carnot’s engine whose temperature of the source is 400K takes 200 calories of heat at this temperature and rejects 150 calories of the heat to the sink. Find the temperature of the sink? Also calculate the efficiency of the engine. | CO3 | 6 |
|  | c | A carnot’s engine whose temperature heat-sink is at 27°C has its efficiency 40%. Find the temperature of the heat sources .By how much should the temperature of the source be raised if the efficiency is to be raised to 70% . | CO3 | 6 |
| 3 |  | Obtain an expression for a concept of a cell in a compartment | CO2 | 20 |
| (OR) | | | | |
| 4 | a. | Calculate the probability that in tossing a coin 8 times  i).Probability of getting 5 heads ii).Pmax iii).Pmin | CO3 | 12 |
|  | b. | Identify different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together? | CO3 | 3 |
|  | c. | A card drawn from well shuffled pack of 52 cards. Calculate the probability for this card to be either Jack or 8. | CO3 | 2 |
|  | d. | A urn contains 6 white and 4 black balls. What is the probability that on two successive drawns the balls drawn are both black in color? | CO3 | 3 |
| 5 | a. | Explain the following:  i).Degree of freedomii).Positon space.  iii).Momentum Spaceiv).Phase space.  v).Mu and Gamma space. | CO2 | 10 |
|  | b. | List any four Fundamental postulates of statistical mechanics. | CO2 | 2 |
|  | c. | Briefy discuss one dimensional harmonic oscillator. | CO2 | 8 |
| (OR) | | | | |
| 6 |  | Discuss in detail about the different types of ensembles and comparison between them. | CO2 | 20 |
| 7 | a. | State and derive Planck’s Radiation law. | CO2 | 16 |
|  | b. | Define photon gas. |  | 4 |
| (OR) | | | | |
| 8 |  | Obtain an epression for Fermi Dirac distribution law. | CO2 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Derive an expression for Vander – Waal’s equation and their critical constants. | CO2 | 20 |